

Remarks


This amendment is submitted in response to the Office Action of April 25, 2002, and following the Request for Continued Examination of October 25, 2002. Reconsideration and allowance is requested.

The issues under 35 U.S.C. §112, the basis for rejecting claims 72-78 and 81-86 (see §10 of the Office Action), have been resolved. The rejected claims 67-71 were cancelled. The remaining claims have been edited taking into account the comments of the Advisory Action. New claims 87-90 have been added. It is submitted that all pending claims are allowable, and such action is respectfully requested.

If any matters can be handled by telephone, Applicant requests that the Examiner telephone Applicant's attorney at the number below.

The Commissioner is authorized to charge any additional fees to Deposit Account No. 20-0782 (Order No. A-63367-1/JAS).

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

72. (Amended) An apparatus for stabilizing the spin axis of a rotating system comprising a disc drive, said rotating system comprising:

a rotor carrying an inertial load comprising at least one disc and bearing means to support said rotor and said disc about said spin axis, and

a motor [means] to cause rotation of said rotor about said spin axis comprising:

a first set of windings;

a magnet supported radially adjacent the windings;

a source of drive current for causing relative rotation between said windings and said magnet; and

an actuator combined with the motor and comprising a source of actuator current energizing said windings to generate a radial force which stabilizes the position of said spin axis and dampens movements of said rotor and disc including [first and second] probes associated with said rotor to measure a gyroscopic motion of said rotor of said shaft, at least one output of said probes being processed to establish a signal applied to energize said [first and second phase] windings and stabilize said system.

73. (Amended) An apparatus as claimed in claim 72 including means for adjusting the direction of said correction force relative to a reference direction corresponding to the position of said probes.

74. (Amended) An apparatus as claimed in claim 73 including means for modifying the magnitude of said current applied to said [first and second phases] windings to adjust the magnitude of the correction force applied to said rotor.

75. (Amended) An apparatus as claimed in claim 74 including a comb filter responsive to the output of said probe to separate components that are synchronous with the speed of said motor of said rotating system from components that are not synchronous with said motor speed and represent oscillatory movements of said rotor to be dampened.

76. (Amended) Apparatus as claimed in claim 75 wherein said actuator current and said drive current are separately applied in time to said windings.

77. (Amended) Apparatus as claimed in claim 75 wherein said actuator current and said drive current are simultaneously applied to said windings.

78. (Amended) An apparatus as claimed in claim 72 wherein said motor has a slotless winding, and said windings of said actuator are concentric but placed in the same airgap between a core and the rotating magnets of said motor.

Please cancel claims 79 & 80.

81. (Amended) An apparatus for stabilizing the spin axis of a rotating system comprising a disc drive, said rotating system comprising:

- a rotor carrying an inertial load comprising at least one disc and bearing [means] to support said rotor and said disc about said spin axis, and

- a motor [means] to cause rotation of said rotor about said spin axis comprising:

- a first set of windings;

- a magnet supported radially adjacent the windings;

- a source of drive current for causing relative rotation between said windings and said magnet; and

- an actuator combined with the motor and comprising a source of actuator current energizing said windings to generate a radial force which stabilizes the position of said spin axis and dampens movements of said rotor and disc further comprising;

- means for sensing movements of said rotor;

- comb means for separating non-repeating movements from repeating movements of said rotor;

said actuator being responsive to said comb means to stabilize said rotor.

82. (Amended) An apparatus as claimed in claim 81 [80] wherein said actuator comprises the first windings and second [phase] windings, which are separately wound and separately energized to generate two radial forces in quadrature.

83. (Amended) An apparatus as claimed in claim 81 [80] comprising means for generating a signal defining each of said currents having first and second input signals representing components of said radial force to be generated, and a third input representing motor position;

memory means addressed with an argument of a function based on said rotor position for providing a trigonometric function based output based on said position; and

multiplier means responsive to said trigonometric function based output signal and said first and second input signals representing components of said radial force to generate elements of a said signal defining said currents.

84. (Amended) An apparatus as claimed in claim 81 [80] wherein said multiplier means comprises a digital/analog converter having said trigonometric based output signals as one input and one of said first and second signals representing said radial force as another input.

85. (Amended) An apparatus as claimed in claim 81 [80] including means for regularly resetting said signal generating means responsive to a motor driven pulse so that reset is proportional to motor rotational speed.

86. (Amended) An apparatus as claimed in claim 81 [80] including a circuit for incorporating an adjustable phase delay into said means for generating a current defining signal.

87. (New) An apparatus as claimed in claim 72 wherein said windings of said motor mean are wound over a stator having a plurality of slots with each winding being wound about one of said slots.

88. (New) An apparatus as claimed in claim 86 wherein said windings comprises at least the first windings and second windings, which are separately wound and separately energized to generate radial forces to stabilize the motor.

89. (New) An apparatus as claimed in claim 88 wherein said motor includes a stator having a plurality of slots, said winding being wound over said slots.

90. (New) An apparatus as claimed in claim 90 including circuit means for separately energizing each of said phases in order to modify the magnitude and direction of said radial force.